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6   UNITED STATES DISTRICT COURT

7   NORTHERN DISTRICT OF CALIFORNIA

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9   IN RE GOOGLE PLAY STORE   MDL Case No. 21-md-02981-JD
    ANTITRUST LITIGATION
10   Member Case Nos. 20-cv-05761-JD,
                                             21-cv-05227-JD
11
                                             ORDER RE MERITS OPINIONS OF
12   **DR. HAL J. SINGER**

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15   In this multidistrict antitrust litigation, several plaintiff groups have challenged Google's

16   Play Store practices. The Play Store is a marketplace that offers millions of apps for devices that

17   use the Android operating system, such as phones and tablets made by Samsung and other original

18   equipment manufacturers. The apps in the Play Store are created and supplied by independent

19   developers, many of whom charge users a fee to acquire the app or in-app content. A central

20   theme in all of the constituent cases of the MDL action is that Google illegally monopolized the

21   Android app distribution market in violation of Section 2 of the Sherman Antitrust Act, which is

22   said to have caused overcharges to consumers and other injuries.

23   This order pertains primarily to the consumers case, *In re Google Play Consumer Antitrust*

24   *Litigation*, Case No. 20-cv-05761-JD. The consumers sued Google, LLC, Google Ireland

25   Limited, Google Commerce Limited, Google Asia Pacific Pte. Limited, and Google Payment

26   Corp. as defendants. In keeping with the parties' practice in the MDL, defendants are referred to

27   collectively as "Google."

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1   The consumer plaintiffs have proffered the opinions of Dr. Hal J. Singer, an economist at

2   the consulting firm, Econ One, and the University of Utah, as an essential part of their case against

3   Google. Dr. Singer previously provided opinion testimony in support of the consumers' motion to

4   certify a class. After a concurrent expert evidentiary proceeding (known informally as a "hot tub")

5   in which Dr. Singer exchanged views on key topics with Google's expert, Dr. Michelle Burtis, an

6   economist at Charles River Associates, the Court denied Google's motion to exclude Dr. Singer's

7   opinions, and certified a consumer class. *See* Dkt. Nos. 302 (Class Cert. Hot Tub Tr.), 383 (Class

8   Cert. Order).[1] An appeal of the grant of certification is pending before the circuit court. *See In re*

9   *Google Play Store Antitrust Litigation*, Case No. 23-15285 (9th Cir.).

10   The consumer plaintiffs have also asked Dr. Singer to provide opinion testimony at trial on

11   the merits of their antitrust claims against Google. The Court has denied Google's request to defer

12   or stay the November 6, 2023, jury trial, *see* Dkt. No. 499, and so proceedings have moved

13   forward to the consideration of motions by Google for partial summary judgment and to exclude

14   the merits opinions of certain experts on the plaintiffs' side. *See* Dkt. Nos. 483, 484, 487.[2] For the

15   experts, Google has asked to exclude under Rule 702 of the Federal Rules of Evidence (FRE) the

16   merits opinions of Dr. Singer, and of Dr. Marc Rysman, an economist at Boston University

17   retained by the State plaintiffs. *See* Dkt. Nos. 487 (Singer), 484 (Rysman).[3]

18   As is the Court's practice for Rule 702 motions involving complex expert evidence, the

19   Court convened on August 1, 2023, a hot tub focused on the parties' main disagreements about the

20   admissibility of the merits opinions of Drs. Singer and Rysman. *See* Dkt. No. 585 (Merits Hot

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22   [1] Unless otherwise noted, all docket number references are to the ECF docket for the MDL, Case
23   No. 21-md-02981-JD.

24   [2] The Match Group plaintiffs have also filed a motion for partial summary judgment on Google's
     counterclaims. Dkt. No. 486.

25   [3] The record is a bit fuzzy on whether the plaintiff States in *State of Utah v. Google LLC*, Case
26   No. 21-cv-05227-JD, intend to rely on Dr. Singer's opinions at trial. Dr. Singer offers all of his
     opinions on behalf of the consumer plaintiffs, and a subset on behalf of "the Consumer Plaintiffs
27   and Plaintiff States." Dkt. No. 489-2 (Singer Merits Report) ¶ 1. Even so, the Court understands
     that the States are relying primarily on the proposed testimony of Dr. Rysman, which is
28   independent of Dr. Singer's work. In any event, this order applies to all cases involving
     Dr. Singer.

1   Tub Tr.). This time, Google presented Dr. Gregory K. Leonard as its expert economist and not

2   Dr. Burtis, on whom Google had relied for the class certification proceedings. Dr. Leonard is an

3   economist at the consulting firm, Charles River Associates. After the hot tub, the Court posed

4   several questions to Dr. Singer and Dr. Leonard, Dkt. No. 570, which they answered under oath on

5   August 14, 2023. Dkt. Nos. 578, 580.

6   After consideration of the now fully developed record, the merits opinions of Dr. Singer

7   are excluded under FRE 702 and the familiar standards in *Daubert v. Merrell Dow*

8   *Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). The motion to exclude Dr. Rysman's merits opinions

9   will be addressed in a separate order.

<p align="center">**BACKGROUND**</p>

11   The Court provided an in-depth background for the litigation in the class certification and

12 expert admissibility order, *see* Dkt. No. 383 (Class Cert. Order), and will not replow that ground

13 here. The parties' familiarity with the background is assumed.

I.   DR. SINGER'S CLASS CERTIFICATION OPINIONS

15   The consumer plaintiffs initially presented Dr. Singer in the class certification proceedings

16 to opine on a proposed method of classwide proof of antitrust impact and damages.[4] In an expert

17 report prepared with respect to certification, Dr. Singer identified and analyzed two proposed

18 relevant markets for the consumers' claims: an Android App Distribution Market and an In-App

19 Aftermarket. *See* Class Cert. Order at 8. For the Android App Distribution Market, Dr. Singer

20 opined that Google's "take rate," meaning the share of revenue Google takes from developers for

21 each app sale, would have fallen from 30.1 percent in actual practice to 23.4 percent in a

22 competitive but-for world. This led Dr. Singer to conclude that Play Store users had paid an

23 average overcharge of $0.30 for each app they purchased, resulting in "aggregate damages of

24 $18.76 million" for the proposed class. *Id*. at 18. For the In-App Aftermarket, which involves

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[4] In his class certification report, Dkt. No. 254-4 (Singer Class Cert. Report), Dr. Singer offered
27 opinions on other elements of the consumer plaintiffs' antitrust claims, *e.g.*, that Google has
    engaged in anticompetitive conduct in the Android App Distribution Market and In-App
28 Aftermarket. Google did not challenge the admissibility of those opinions. *See* Dkt. No. 252.

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1   purchases a user makes within an app after buying it, Dr. Singer opined that Google's take rate for

2   in-app content would have fallen from 29.2 percent in actual practice to 14.8 percent in a

3   competitive but-for world, resulting in an "average $1.34 consumer savings per transaction and an

4   aggregate damage figure of $4.71 billion." *Id*. Dr. Singer offered an alternative damages model

5   based on Google's Play Points rewards program, and concluded that in a competitive but-for

6   world, the Play Points program would have "expanded to be worth an average of $0.77 per

7   transaction, or approximately 8.7 percent of consumer spend," resulting in aggregate damages of

8   $2.71 billion. *Id*. at 22; Singer Class Cert. Report ¶ 255.

9   For certification purposes, the Court determined that the Rule 23 questions of commonality

10   and predominance could be answered for the class as a whole on the basis of Dr. Singer's

11   overcharge models for the Android App Distribution Market and In-App Aftermarket, and so

12   deferred for another day consideration of the Play Points model. Class Cert. Order at 23. The

13   Court overruled Google's primary objection that Dr. Singer's overcharge models were

14   inadmissible under FRE 702 because they were based on a faulty "pass-through" formula that

15   Dr. Singer used to quantify how much of Google's developer fees consumers would ultimately

16   end up paying. As the Court noted, the pass-through formula was a "critical element of

17   Dr. Singer's overcharge analysis," and "was an input for both the Rochet-Tirole model (which

18   Dr. Singer used for the Android App Distribution Market) and the Landes-Posner model (used for

19   the In-App Aftermarket)." *Id*. at 9, 17. The pass-through formula was essential because app

20   developers independently set the prices of the apps and in-app content they make available

21   through the Play Store. The purpose of the pass-through formula was to quantify the "portion of

22   the supracompetitive cost imposed on developers" by Google that was "passed through" to, or

23   more aptly paid by, consumers. *Id*. at 17. This is a critical part of the consumers' claim that they

24   overpaid for apps and in-app content as a result of Google's anticompetitive conduct, and so a

25   classwide method of determining the pass-through rate was vital to the certification motion.

26   Dr. Singer used a pass-through formula "derived from a logit model," which Dr. Singer

27   believed would correctly model "the demand curve faced by the developers who sell apps and

28   content in the Google Play Store." *Id*. Dr. Singer opined in his certification report that "the pass-

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1   through formula may ultimately be expressed as 'one minus the share' an app has in its self-

2   selected Play Store category." *Id.* at 17-18. To unpack this at a high level, "category" refers to

3   Google's own denomination of broad topical groupings such as "education," "game," "sports,"

4   and the like used to organize apps in the Play Store. If an app has, say, a 20% share of the sports

5   category, then for that app, Dr. Singer would estimate a pass-through rate of 1 - 20% = 80%.

6   Dr. Singer's ultimate calculation of the overcharges paid by consumers entails several additional

7   steps, but this logit-based pass-through formula is an essential core element of his overall

8   approach.

9   As the proponents of Dr. Singer's expert testimony, plaintiffs had the burden of

10   establishing its admissibility over Google's objections. *See Southland Sod Farms v. Stover Seed*

11   *Co.*, 108 F.3d 1134, 1141-42 (9th Cir. 1997) (plaintiff, as "proponent of scientific evidence" had

12   "burden of establishing that the evidence is scientifically valid," but nevertheless concluding that

13   "[b]ecause Defendants have not demonstrated that Plaintiffs are unable to make such a showing as

14   a matter of law, we will not exclude [plaintiffs' expert's] testimony under *Daubert*."). An

15   important aspect of the admissibility analysis at the class certification stage was a careful

16   consideration of the comments made by Google's proffered expert, Dr. Michelle Burtis, in her

17   certification report and at the hot tub with Dr. Singer. The goal of the hot tub was to provide

18   Google with the opportunity, through its expert, to illuminate its concerns about Dr. Singer's

19   work, and to give Dr. Singer an opportunity for a real-time response. At the Court's direction,

20   Dr. Burtis and Dr. Singer jointly prepared a list of discussion topics for the hot tub, in descending

21   order of importance for the question of certification. *See* Dkt. No. 284, Ex. 1.

22   Critically, for certification purposes, Dr. Burtis did not say that Dr. Singer's opinions,

23   including his pass-through analysis, were "junk science" that ought to be excluded. *See Ellis v.*

24   *Costco Wholesale Corp.*, 657 F.3d 970, 982 (9th Cir. 2011). To the contrary, and with specific

25   respect to Dr. Singer's pass-through model, Dr. Burtis stated: "As I said, the model exists in the

26   literature; and I'm not here to say that this is a model that nobody uses. I won't say that about this

27   model. Whether it's the right model, I don't know, and I don't have an opinion." Class Cert. Hot

28   Tub Tr. at 24:12-15. Dr. Burtis also said, again in specific reference to Dr. Singer's pass-through

1 model: "Regarding this model, I would say, I don't think this model itself is junk science. I

2 wouldn't say that. All I'm saying here is that, you know, Dr. Singer, he didn't try to adapt the

3 model, to really test the issue of common impact here. He didn't do anything to test." *Id*. at 26:1-

4 5.

5   Dr. Burtis's expert report was equally benign about Dr. Singer's pass-through formula as a

6 method of analysis. *See* Dkt. No. 254-5 (Burtis Report). Dr. Burtis devoted three short

7 paragraphs in a 125-page report to the question of whether a logit demand model could, as a

8 matter of sound economics, generate reliable pass-through rates in the Play Store market. *Id*. at

9 ¶¶ 306-08. She did not say that a credible economist would never use a logit model in the Play

10 Store context. Dr. Burtis agreed that the logit model was "frequently used in economics." *Id*. ¶

11 306. Her main substantive criticism was that Dr. Singer was wrong to use Google's app

12 categories for the logit analysis, and that he should have come up with his own customized

13 groupings of apps into "more appropriate categories" that would "ensure that substitutes are

14 properly grouped together." *Id*. ¶ 311; *see also id*. ¶ 279 ("The 'categories' used by Dr. Singer,

15 which are integral to the results, are not based on any economic analysis or reasoning but are

16 simply the categories used in Google Play."). Dr. Burtis also faulted Dr. Singer for not accounting

17 for variables such as developers' marginal costs and pricing strategies to set prices that end in

18 $0.99 cents. *See id*. ¶¶ 303-04, 313.

19   Overall, Dr. Burtis did not challenge the fundamental soundness of Dr. Singer's approach

20 in light of the economic literature, and instead offered criticisms that went to the weight of his

21 opinions, and not to admissibility. Consequently, after conducting an independent analysis of

22 Dr. Singer's work and weighing Google's objections, the Court determined that Dr. Singer's

23 testimony was admissible for certification purposes. *See* Class Cert. Order. Google did not

24 challenge the expert qualifications of Dr. Singer, a well-credentialed economist who is active in

25 the antitrust field. *See id*. at 8. On the record as it then stood, plaintiffs met their burden of

26 establishing admissibility, and Google and Dr. Burtis did not state objections that demonstrated

27 that Dr. Singer's opinions warranted exclusion as junk science under Rule 702 or *Daubert*, 509

28 U.S. 579.

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II.   DR. SINGER'S MERITS OPINIONS

The situation has developed at the merits stage. The consumer plaintiffs proffer Dr. Singer again to provide expert testimony on the substance of their antitrust claims, over Google's objections. Google does not challenge Dr. Singer's qualifications as an expert, the relevance of his testimony, or all of his opinions. Its motion to exclude is directed only at the injury and damages portions of Dr. Singer's work, and it challenges his opinions on these topics as unreliable under FRE 702 and *Daubert*. *See* Dkt. No. 487.

In substantial measure, Dr. Singer's injury and damages opinions are the same in his class certification and merits reports. The pass-through formula is the same, and Dr. Singer again uses the Rochet-Tirole model for the Android App Distribution Market and the Landes-Posner model for the In-App Aftermarket. Singer Merits Report ¶¶ 288, 326, 358. But this time, Dr. Singer offers aggregate damages figures calculated six different ways: (1) aggregate overcharge damages of $23.83 million for the Android App Distribution Market; (2) aggregate overcharge damages of $7.00 billion for the In-App Aftermarket; (3) a "discount model" based on Google Play Points, calculated for a combined Android App Distribution Market and In-App Aftermarket "where the locus of competition is on the consumer subsidy," producing $3.92 billion in damages; (4) a "single take rate" damages calculation, "where competition occurs only with respect to the take rate in a single, combined market," resulting in $3.66 billion in damages; (5) an "Amazon Discount Model," using the "Amazon Appstore's consumer discounts" as a "reasonable benchmark for calculating aggregate damages," producing $8.039 billion in damages; and (6) a single-market "hybrid model," in which competition occurs with respect to both the take rate and buyer-side subsidy, producing $3.81 billion in aggregate damages. *Id*. ¶¶ 414-21, 441-45.

With respect to the pass-through formula, Dr. Singer again states that, "when demand is logit, a developer's pass-through rate can be estimated as one minus that developer's category share." *Id*. ¶ 358. The pass-through formula continues to be an essential input in his calculation of aggregate overcharge damages for the Android App Distribution Market, *see id*. at 141, Table 6, and the In-App Aftermarket, *see id*. at 155, Table 8. The pass-through rate is also an input for the "single take rate" model, *see id*. at 265, Table A4, and the "hybrid" model, *see id*. at 267,

1   Table A5. It is not an input for the "discount" model, *see id*. at 191, Table 16, or the Amazon

2   Discount model, *see id*. at 206, Table 21.

3   Google's response to Dr. Singer has changed since class certification. Most notably,

4   Dr. Burtis has yielded the floor to a new expert witness, Dr. Leonard. *See* Dkt. No. 487.

5   Dr. Leonard took a fresh look at Dr. Singer's opinions and proffered, as will be discussed, a

6   different response from Dr. Burtis. As the Court stated at the merits hot tub, it has some

7   misgivings about Google taking a second shot at Dr. Singer's testimony with a new witness. Even

8   so, the path to a fair result often has some turns, particularly as the record develops in a complex

9   antitrust dispute such as this one. Consideration of Google's revised FRE 702 presentation based

10   on a new expert witness serves "the end of ascertaining the truth and securing a just

11   determination" in this multidistrict litigation. Fed. R. Evid. 102.

DISCUSSION

I.   LEGAL STANDARDS

14   As Federal Rule of Evidence 702 states, a "witness who is qualified as an expert by

15   knowledge, skill, experience, training, or education may testify in the form of an opinion or

16   otherwise if: (a) the expert's scientific, technical, or other specialized knowledge will help the

17   trier of fact to understand the evidence or to determine a fact in issue; (b) the testimony is based on

18   sufficient facts or data; (c) the testimony is the product of reliable principles and methods; and

19   (d) the expert has reliably applied the principles and methods to the facts of the case."

20   This rule is expected to be updated soon. By order of the United States Supreme Court

21   dated April 24, 2023, a proposed amendment to FRE 702 will take effect on December 1, 2023,

22   barring any contrary Congressional action. *See* https://www.supremecourt.gov/orders/

23   ordersofthecourt/22 ("4/24/23 Rules of Evidence"); 28 U.S.C. § 2074. The proposed amendment

24   clarifies that an expert witness's opinion testimony is admissible under FRE 702 only "if the

25   proponent demonstrates to the court that it is more likely than not that" the proposed testimony

26   satisfies subsections (a) through (d) of the Rule. Subsection (d) will also be replaced in its entirety

27   to provide that the expert's opinion must "reflect[] a reliable application of the principles and

28   methods to the facts of the case." *See* Supreme Court's 4/24/23 Order. In the Court's view, the

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1   proposed amendment is not a sea change but rather an amplification of existing FRE 702

2   standards. For present purposes, the Court is mindful of FRE 702 as it stands today and as it will

3   be imminently amended.

4   As the Court has observed in another case, the FRE 702 admissibility standard does not

5   change with the different stages of litigation or become more rigorous as a case progresses from

6   class certification to the merits stage. *See In re Capacitors Antitrust Litigation*, MDL Case

7   No. 17-md-02801-JD, 2020 WL 870927, at *2 (N.D. Cal. Feb. 21, 2020). At all stages, "Rule 702

8   of the Federal Rules of Evidence tasks a district court judge with 'ensuring that an expert's

9   testimony both rests on a reliable foundation and is relevant to the task at hand.'" *Elosu v.*

10 *Middlefork Ranch Inc.*, 26 F.4th 1017, 1023 (9th Cir. 2022) (quoting *Daubert*, 509 U.S. at 597).

11   Reliability is the touchstone. "The test of reliability is flexible," and "the trial court has

12 discretion to decide how to test an expert's reliability as well as whether the testimony is reliable,

13 based on the particular circumstances of the particular case." *Primiano v. Cook*, 598 F.3d 558,

14 564 (9th Cir. 2010) (cleaned up). As the amendment of FRE 702 emphasizes, the burden of

15 establishing the reliability of the proposed expert witness testimony rests with the proponent of the

16 expert evidence. *See Southland Sod*, 108 F.3d at 1141. The Court "must decide any preliminary

17 question about whether a witness is qualified, . . . , or evidence is admissible," and "[i]n so

18 deciding, the court is not bound by evidence rules, except those on privilege." Fed. R. Evid.

19 104(a). When "admissibility determinations . . . hinge on preliminary factual questions," those

20 factual matters must be "established by a preponderance of proof"; application of the

21 "preponderance standard ensures that before admitting evidence, the court will have found it more

22 likely than not that the technical issues and policy concerns addressed by the Federal Rules of

23 Evidence have been afforded due consideration." *Bourjaily v. United States*, 483 U.S. 171, 175

24 (1987).

25 **II.   THE PASS-THROUGH FORMULA**

26   In his merits opinions, Dr. Singer used a pass-through formula "specific to logit" that was

27 developed by the economists Nathan Miller, Marc Remer, and Gloria Sheu, and he applied that

28 formula here "to calculate pass-through rates for each Play Store category." Singer Merits Report

1   ¶¶ 358, 360.   The Google Play Store has approximately 33 app categories for "Beauty," "Dating,"

2   "Events," "Health and Fitness," "Productivity," "Weather," and similar categories, and app

3   developers self-select a category when positioning their apps in the Play Store. *Id*. ¶¶ 349-50 &

4   Table 13. In Dr. Singer's view, "Miller et. al. demonstrate mathematically that, when firms are

5   subjected to an industrywide change in costs, the profit-maximizing change in the price of a

6   particular product i in response to a one dollar change in a firm's marginal cost is equal to $[M -$

7      $Q_i]/M$, where M is the size of the category -- inclusive of the outside good -- and Q_i is the quantity

8   sold of product i. This means that, when demand is logit, a developer's pass-through rate can be

9   estimated as one minus that developer's category share, consistent with what has been shown

10   previously in the peer-reviewed economics literature." *Id*. ¶ 358.

11   The reliability of this logit-based pass-through rate depends on whether Dr. Singer reliably

12   "estimate[d] logit demand systems for each of the categories used by Google." *Id*. ¶ 354. "In a

13   logit demand system, each product within the system has its own (nonlinear) demand curve, given

14   by the following formula: $\ln(S_j / S_0) = \delta_j + \alpha P_j$." *Id*. ¶ 348. Dr. Singer explains, "S_j is the share of

15   product j, and S_0 is the share of the outside good -- that is, the proportion of consumers that do not

16   purchase any of the products at issue. The term δ_j represents factors other than price that shift

17   demand (and thus share). These are modeled as fixed effects unique to a given App and purchase

18   type (Initial Downloads, In-App, and Subscription). The model also includes fixed effects by

19   state, and for sub-products within a given App (e.g., Pandora Plus versus Pandora Premium)." *Id*.

20   Dr. Singer states that "[e]conomists have frequently used logit to analyze a variety of economic

21   phenomena, including (but not limited to) potentially anticompetitive conduct in markets with

22   differentiated products." *Id*. He also states that "[t]he standard logit model is widely used by

23   economists to estimate pass-through in a range of contexts," and he acknowledges that the logit

24   demand system implies "that developers in a given category pass through cost savings according

25   to their dominance (or lack thereof) in the category, as measured by their market share within that

26   category." *Id*. ¶¶ 351, 356.

27   In response to these and related propositions by Dr. Singer, Dr. Leonard presented several

28   new critiques and points of information. The most salient of these concerned the logit model's

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1   "IIA" property. As Dr. Leonard stated in his report, the logit model "exhibits what is called the

2   'independence of irrelevant alternatives' (IIA) property. The IIA property places strong

3   restrictions on substitution patterns between products (i.e., the own- and cross-price elasticities of

4   demand). Because of IIA's restrictiveness regarding substitution patterns, from the early 1980s,

5   the economics literature has warned about the use of the logit model of demand." Dkt. No. 489-3

6   (Leonard Report) at 60 n.76; *see also id*. ¶ 153. This was new information in that Dr. Burtis had

7   not specifically identified or highlighted the IIA property in a meaningful way. She did not use

8   that term in her report. *See* Dkt. No. 254-5. She and Dr. Singer did not identify the IIA restriction

9   as a topic for debate at the certification hot tub. *See* Dkt. No. 284, Ex. 1. During the hot tub

10   discussion, Dr. Burtis never expressly mentioned IIA and made only a passing mention of

11   substitution late in the proceeding. *See* Dkt. No. 302 at 88:22-91:7.

12   In significant contrast, Dr. Leonard put the IIA property of logit front and center in his

13   challenge to Dr. Singer's analysis. Dr. Singer does not seriously dispute Dr. Leonard's

14   observations about the IIA property itself. In the experts' joint statement of topics for the merits

15   hot tub, Dr. Singer said that he "will address Google's claim that he misapplied logit because the

16   property of 'IIA' or 'proportional substitution' -- when prices for one product increase, consumers

17   switch to substitutes in proportion to their relative shares -- is allegedly not satisfied." Dkt.

18   No. 540-2 at 12. Dr. Singer added that he "will explain that it is reasonable to conclude that the

19   proportional substitution property is satisfied here, as evidenced by his regressions . . . .

20   Moreover, logit is routinely and reliably used as an approximation even when IIA is not strictly

21   satisfied . . . ." *Id*. Dr. Leonard, on his part, stated that "[o]ne feature of the logit model

22   Dr. Singer used is the 'irrelevance of independent alternatives' property, or IIA, which holds that

23   all goods in the market where demand is being studied are substitutes for one another in

24   proportion to their share of that market. There is an economic consensus that if real world

25   demands do not satisfy this property, then the model will yield unreliable results. . . . As applied

26   to demand for Android apps, the IIA principle means that all apps in a given app category must be

27   substitutes for each other, and must be substitutes in proportion to their share of that category.

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1   However, Dr. Singer concedes that apps in each category fail this condition. This makes his entire

2   model unreliable." *Id*. at 12-13.

3   The IIA issue was raised in the parties' Rule 702 motion briefing, *see* Dkt. No. 487 at 6-10,

4   Dkt. No. 508 at 5-9, and was discussed in detail at the merits hot tub. In his opening comments

5   about Dr. Singer's work, Dr. Leonard underscored that "the big problem with the logit model is

6   the so-called IIA assumption. . . . [S]ince probably 1977 or so there have been well-known tests

7   that test for the IIA assumption. And it's also very well known you shouldn't just assume logit

8   because it has these very restrictive assumptions on substitution patterns . . . basically a

9   proportional substitution." Merits Hot Tub Tr. at 27:18-25. Dr. Singer did not take serious issue

10   with Dr. Leonard. When the Court asked, "what is the source of the proportionate substitution or

11   demand proposition, is that Miller?" Dr. Singer said, "Oh, I think it will be in Miller, but it will be

12   on any -- in any -- I don't think that's disputed. It's proportional substitution. That's what the --

13   that's what the IIA property is about." *Id*. at 52:8-14.

14   This discussion at the hot tub, and in the merits reports generally, put a much finer point

15   than at class certification on the question of whether Dr. Singer's logit-based pass-through formula

16   was sufficiently valid and reliable to be admissible. The Court inquired further into the question

17   when it called for additional comments by the economists after the hot tub proceeding. Dkt.

18   No. 570. Among other inquiries, the Court asked: "(A) What economic literature states that a

19   regression analysis is a reliable way of (i) testing for the IIA assumption in the logit model, or

20   (ii) confirming that a logit model can be used to reliably measure the relevant demand curve

21   here?" And, "(B) To what extent can IIA be 'not strictly satisfied' before the use of logit model

22   becomes unreliable? How can the Court know that this limit has not been crossed here? How

23   close is the 'approximation' that Dr. Singer posits, and how can the Court have confidence that his

24   logit model has produced a sufficiently reliable approximation of pass-through here even if the

25   apps in each category are not proportional substitutes for one another?" *Id*. at 2.

26   Dr. Singer and Dr. Leonard filed sworn answers to the follow-up questions. Dkt. Nos. 578,

27   580. Dr. Leonard stated that the "defining characteristic of the logit model is the IIA assumption,

28   which forces a particular substitution pattern on the data, regardless of how consumers actually

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1   substitute among products in the marketplace being studied." Dkt. No. 578 ¶ 6. Dr. Leonard also

2   stated that, in the "specific case of Android apps, given the category definitions that Dr. Singer

3   used, the IIA assumptions of the logit model that all apps are substitutes and substitution is

4   proportional to shares are clearly false," because "[s]ome of the apps within a category are not

5   substitutes for each other at all, let alone in a manner proportional to their respective shares." *Id.*

6   ¶ 19. To illustrate, Dr. Leonard gave the example of "Rosetta Stone," "Duolingo," and

7   "PictureThis - Plant Identifier," which are "three apps in the Education category." *Id.* Rosetta

8   Stone has less than a 5% category share; Duolingo has around 15%; and PictureThis - Plant

9   Identifier has around 20%. *Id.* Dr. Leonard observed that, "[w]ith entirely different functionality

10   than the language learning apps, there can be no serious argument that PictureThis - Plant

11   Identifier is any kind of substitute at all for Rosetta Stone," and yet, "the logit model, with its IIA

12   assumption, assumes that if Rosetta Stone raised its price and some customers substituted away,

13   PictureThis - Plant Identifier would capture a larger percentage of these switching customers than

14   Duolingo . . . simply because PictureThis - Plant Identifier has a larger category share than

15   Duolingo." *Id.* In Dr. Leonard's view, "[t]his makes no economic sense at all." *Id.*

16   Dr. Singer stated in his response to the follow-up questions that "IIA is a property of

17   logit," and "[a]pplied here, IIA implies that consumers will tend to substitute among different

18   Apps within a given category in proportion to an Apps' share in that category ('proportional

19   substitution' or 'proportionate shifting')." Dkt. No. 580 ¶ 13. Dr. Singer's comments were

20   consistent with Dr. Leonard in terms of how the IIA assumption would be expected to play out in

21   the context of apps in the Play Store: "Suppose the price of App *A* increases. To avoid the price

22   hike, some consumers will switch to different Apps within the same category. Suppose further

23   that App *B* is very popular, with a category share of 50 percent, and that App *C* is less popular,

24   with a category share of just one percent. Under proportional substitution, these consumers are

25   more likely to switch to the (more popular) App *B* than they are to switch to the (less popular) App

26   *C*. Specifically, consumers are, on average, fifty times more likely to switch to App *B* than App *C*

27   under this assumption." *Id.*

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1   Critically, Dr. Singer did not explain why this assumption would still make economic

2   sense if App *A* and App *C* were more similar, like Duolingo and Rosetta Stone, and App *B* were

3   entirely different, such as PictureThis - Plant Identifier. As Dr. Leonard suggests, it is intuitively

4   obvious that users looking for an app to learn Italian will not try to avoid a price hike by switching

5   to an app that identifies the type of geranium in their kitchen. This intuition highlights a

6   fundamental problem that a jury would face if Dr. Singer's opinions were presented at trial. It

7   may be possible for a jury to make reasonable decisions about the substitutability of certain apps

8   at a very high and general level, but Dr. Singer's analysis does not provide usable guidance on

9   what to do with the myriad of differences and distinctions between apps within the Google Play

10 Store categories. He does not provide any boundaries on substitution in broad app categories that

11 contain many unlike products. This would create a serious risk of the jury simply guessing about

12 proportionate substitution and ultimately the pass-through of fees to consumers.

13   Dr. Singer's position with respect to the IIA property of logit is further eroded by one of

14 the main authorities he cited in his follow-up response and attached in full as an exhibit: Kenneth

15 Train, *Logit*, *in Discrete Choice Methods with Simulation* 34 (Cambridge University Press 2009).

16 *See* Dkt. No. 580, Ex. 15. Professor Train's chapter on logit deepens rather than alleviates the

17 Court's concern that the logit model cannot be reliably used in the context of apps in the Google

18 Play Store in the way Dr. Singer has done in his analysis. Professor Train starts with the

19 observation that "[b]y far the easiest and most widely used discrete choice model is logit." *Id*. at

20 34. He explains that "[i]ts popularity is due to the fact that the formula for the choice probabilities

21 takes a closed form and is readily interpretable." *Id*.

22   From there, he sounds many cautionary notes about the appropriateness of its use. He

23 states, for example, that "[l]ogit models can capture taste variations, but only within limits. In

24 particular, tastes that vary systematically with respect to observed variables can be incorporated in

25 logit models, while tastes that vary with unobserved variables or purely randomly cannot be

26 handled." *Id*. at 43. Also, "if taste variation is at least partly random, logit is a misspecification.

27 As an approximation, logit might be able capture the average tastes fairly well even when tastes

28 are random, since the logit formula seems to be fairly robust to misspecifications. The researcher

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1   might therefore choose to use logit even when she knows that tastes have a random component,

2   for the sake of simplicity. However, there is no guarantee that a logit model will approximate the

3   average tastes. And even if it does, logit does not provide information on the distribution of tastes

4   around the average. This distribution can be important in many situations . . . ." *Id.* at 44.

5   Further, "[p]roportionate substitution can be realistic for some situations, in which case the logit

6   model is appropriate. In many settings, however, other patterns of substitution can be expected,

7   and imposing proportionate substitution through the logit model can lead to unrealistic forecasts."

8   *Id.* at 48.

9   These comments support Dr. Leonard's critiques and undercut the reliability of

10   Dr. Singer's work. Dr. Singer endeavors to use the logit model in an overly simple way to

11   represent the demand curve for developers in the Play Store. In Dr. Singer's model, when the

12   price of an app goes up, the consumer will necessarily switch to a different app in the same

13   category, based purely on the popularity of those other apps. As Dr. Singer acknowledges, this

14   approach works only if the apps within each category are proportional substitutes for one another.

15   This is an unproven assumption in Dr. Singer's work. It cannot be squared with the economic

16   literature such as that of Professor Train, and it flies in the face of the huge diversity of apps

17   within the Play Store categories. As Dr. Leonard has noted, given the broad categories in the

18   Google Play Store, which developers self-select, the IIA's assumption that "all apps are substitutes

19   and substitution is proportional to shares" is not factually supported in this context. Dkt. No. 578

20   ¶ 19.

21   Dr. Singer's main defense is to say that "IIA is reliably established here" because he has

22   "confirmed using standard regression methods from the economic literature that the logit demand

23   curve is well-specified here." Dkt. No. 580 at 8. The problem is that nothing validates the use of

24   regressions in this manner. Professor Train certainly did not identify this kind of regression

25   analysis as a way of validating a use of logit. He did say that the "independence assumption . . . in

26   fact can be interpreted as a natural outcome of a well-specified model," and that "[i]n a deep

27   sense, the ultimate goal of the researcher is to represent utility so well that the only remaining

28   aspects constitute simply white noise; that is, the goal is to specify utility well enough that a logit

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1   model is appropriate. Seen in this way, the logit model is the ideal rather than a restriction." *Id*.,

2   Ex. 15 at 35-36. But this observation does not appear to fit Dr. Singer's model. He has not

3   specified his observed variables so well that "the remaining, unobserved portion of utility is

4   essentially 'white noise.'" *Id*. at 35. Rather, as Dr. Leonard notes, Dr. Singer's model "includes

5   only the app price and a set of SKU-time-state indicator variables. This leaves plenty of room for

6   substantial correlation among the remaining unobserved portions of a consumer's utilities for

7   apps. For example, consumers who like a given single-shooter game likely also like other single-

8   shooter games . . . . That is, such consumers will exhibit positive correlation among unobserved

9   parts of their utilities for single-shooter games. The unobserved portions of their utilities are not

10 just 'white noise.' The price and indicator variables included in Dr. Singer's model would not

11 capture this correlation in consumers' preferences over single-shooter games and therefore the

12 'ideal' would not be met and the logit model would not apply." Dkt. No. 578 ¶ 29.

13   Dr. Leonard has also pointed out that Dr. Singer did not compare the "fit" of the logit

14 model with "that of an alternative demand model." *Id*. ¶ 14. And in Dr. Leonard's view,

15 Dr. Singer's claim that he "obtained the 'right' signs and statistical significance on the price

16 coefficients in his regression model as support for the logit model" is "a low bar," because "all

17 demand models predict lower share (i.e., lower quantity) when price increases and vice versa." *Id*.

18 at 8 n.9. Similarly, the States' expert, Dr. Rysman, was asked in his deposition whether it would

19 be sufficient for him "to determine that a standard logit model was appropriate that there was a

20 negative correlation between price and demand," and he responded, "Not by itself[,] that wouldn't

21 tell me that the logit model was appropriate." Dkt. No. 487-4 at 68:21-69:2. While plaintiffs have

22 pointed out that Dr. Rysman "had not read Dr. Singer's report," Dkt. No. 508 at 7 n.5, it is hard to

23 see why that would matter for purposes of the answer Dr. Rysman gave, which stands on its own

24 and bolsters Dr. Leonard's critique of Dr. Singer's work.

25   Overall, the record at the merits stage is substantially more developed than at class

26 certification, and establishes that Dr. Singer's pass-through model is not within accepted economic

27 theory and literature, and is based on assumptions about the Play Store apps that are not supported

28 by the evidence. The model does not give the jury a sound basis on which to make a reasoned and

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1   reasonable judgment about antitrust impact and damages in a product market that does not show

2   proportional substitution across alternatives, at least not on a Play Store category share basis as

3   Dr. Singer has modeled.

4   Because that pass-through model is the keystone of Dr. Singer's overcharge analysis, his

5   opinions based on it must be excluded. The purpose of judicial gatekeeping under Rule 702 is "to

6   make certain that an expert . . . employs in the courtroom the same level of intellectual rigor that

7   characterizes the practice of an expert in the relevant field." *Kumho Tire Co., Ltd. v. Carmichael*,

8   526 U.S. 137, 152 (1999). Dr. Singer's use of a logit approach to model the demand curve faced

9   by app developers in the Play Store, ultimately producing the simple pass-through formula of one

10   minus the app's share of its category, was a decision that "fell outside the range where experts

11   might reasonably differ, and where the jury must decide among the conflicting views of different

12   experts, even though the evidence is 'shaky.'" *Id*. at 153 (quoting *Daubert*, 509 U.S. at 596).

13   Because the characteristics of a logit model and its IIA property are enough to find that

14   Dr. Singer's pass-through formula here is not sufficiently reliable to be admitted under Rule 702,

15   the Court declines to reach Google's other arguments that the pass-through formula suffers from

16   additional admissibility shortcomings.[5] Since Dr. Singer's pass-through formula is not reliable

17   enough to be admitted, his testimony about that formula, and his injury and damages opinions that

18   necessarily rely on it, are excluded.

19   **III.   THE CONSUMER SUBSIDY MODELS**

20   As an alternative approach, Dr. Singer offered "consumer subsidy" models that did not use

21   the pass-through formula. Opinions with respect to these models are also excluded.

22   The main reason for exclusion is that the analysis behind the subsidy models is too anemic

23   to let them go to a jury. For the Play Points model, Dr. Singer relies on wholly speculative

24   assumptions that make his opinions ipse dixit unsuitable for admission at trial. For example, he

25   states, with no visible factual support, that "the structure of Play Points is a reasonable facsimile of

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27   [5] Google's motion for leave to file a supplemental brief in support of its Rule 702 motion, Dkt.
     No. 541, is granted. For the sake of deciding this issue on as complete a record as possible, the
28   Court reviewed and considered Google's supplemental brief and attachments, as well as plaintiffs'
     opposition and attached supplemental reports. Dkt. Nos. 541-1, 550.

what an expanded program might look like in a competitive but-for world," Singer Merits Report

¶ 373, and that "[c]onsumers would have enhanced economic incentives to enroll and participate

in a Play Points offering more valuable incentives in the but-for world, just as consumers have

more incentives to participate in a more generous credit card rewards program than a less generous

one." *Id*. ¶ 381. Why any of this might be true is not said. Dr. Singer's Play Points calculations

also rest on the assumption that, in the but-for world, Google "maintains a 60 percent market share

with an inelastic supply response from Google's rivals." *Id*. ¶ 386. Dr. Singer says that "[e]ven in

the presence of substantial competition, I assume conservatively that Google would have retained

a substantial market share of 60 percent," because "this was approximately AT&T's market share

in the long-distance market after competitive entry." *Id*. ¶ 331. It is again not explained, and is

certainly not obvious, why the situation AT&T faced in the telecom market in the 1980s is a good

benchmark for Google's app store practices today. As Dr. Leonard aptly commented, "[t]he

economics of long distance service in the 1980s and early 1990s differed substantially from the

but-for world for Android app stores in this case," and "without an in-depth analysis," there is an

insufficient basis "to think that the entry costs, requirements, and market opportunity for one or

more new firms to compete with the incumbent would be the same in the Android app store

marketplace as was the case in the 1980s and early 1990s long distance service marketplace."

Dkt. No. 578 ¶¶ 43-44.

So too for Dr. Singer's other consumer subsidy model. Dr. Singer devotes a paltry four

paragraphs to a purported Amazon Coins discount damages model. Singer Merits Report ¶¶ 417-

20. Not surprisingly, those four paragraphs do not adequately explain why or how the Amazon

Appstore might be a "reasonable approximation" of damages here. *Id*. ¶ 418. Dr. Singer again

simply asserts, with no real analysis or data, that "Amazon's aggregate discount . . . on third-party

devices is a reasonable benchmark for estimating aggregate damages." *Id*. ¶ 419.

"[N]othing in either *Daubert* or the Federal Rules of Evidence requires a district court to

admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert. A

court may conclude that there is simply too great an analytical gap between the data and the
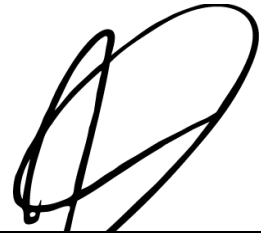
1   opinion proffered." *General Electric Co. v. Joiner*, 522 U.S. 136, 146 (1997). That is the case

2   here for Dr. Singer's consumer subsidy models.

3   **CONCLUSION**

4   Google's motion to exclude the merits opinion testimony of Dr. Singer, Dkt. No. 487, is

5   granted.

6   **IT IS SO ORDERED.**

7   Dated: August 28, 2023

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9   _____

10 JAMES DONATO
    United States District Judge

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United States District Court
Northern District of California

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